

PATENT CLAIMS:

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1. A method for determining correction values for the wheel speeds of a vehicle, comprising the step of determining the speeds of the vehicle wheels during travel, characterized in that the speeds of the vehicle wheels are evaluated in groups for at least one vehicle axle and at least one vehicle side, and that the correction values for the individual vehicle wheels are determined in accordance with the results of evaluation.
2. A method according to claim 1, characterized in that the evaluation in groups is effected for the wheels of the non-driven axle and for the wheels of the left-hand vehicle side and the right-hand vehicle side.
3. A method according to claims 1 or 2, characterized in that the evaluation in groups is effected for wheel speeds in relation to the wheel speed values determined during a state of travel in which conditions exist that are favorable for the evaluation of the wheel speed values of the group under consideration.
4. A method according to any one of the preceding claims, characterized in that, grouped by vehicles axles, those determined speeds of the vehicle wheels are evaluated, that are determined during a straight travel of the vehicle.
5. A method according to any one of the preceding claims, characterized in that, grouped by vehicle sides, those speeds of the vehicle wheels are evaluated that are determined during the disengaged state.
6. A method according to any one of the preceding claims, characterized in that, grouped by vehicle sides, those speeds of the vehicle wheels are evaluated that are determined during a travel state in which the driving moment or the vehicle acceleration is positive

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and the speed of the wheel on the axle driven or deemed driven is lower than the speed of the wheel on the axle non-driven or deemed non-driven, or during a travel state in which the driving moment or the vehicle acceleration is negative and the speed of the wheel on the axle driven or deemed driven is higher than the speed of the wheel on the axle non-driven or deemed non-driven.

7. A method of any one of the preceding claims, characterized in that the wheel speeds used for the evaluation grouped by vehicle sides can be determined at different times than the wheel speeds used for the evaluation grouped by vehicle axles.

8. A method according to any one of the preceding claims, characterized in that the evaluation in groups of wheel speeds covers the ratio formation and/or difference formation and/or the pair-wise normalization of the speeds of the wheels of this group.

9. A method according to any one of the preceding claims, characterized in that a correction value is selected for one wheel, preferably the slowest wheel, and in relation thereto and in accordance with the results of evaluation, correction values are determined for the rest of the vehicle wheels.

10. A method according to any one of the preceding claims, characterized in that on each vehicle side a preliminary correction value is selected for one of the wheels, preferably for the slower one, and for the respectively other wheel on this side, a preliminary correction value is determined in accordance with the wheel speeds determined on that side.

11. A method according to claim 10, characterized in that the final values of correction are determined from the preliminary values of correction in accordance with the wheel speeds determined on one axle.

09647109-122700

12. A method according to any one of the preceding claims, characterized in that the determination of the wheel speed of one wheel covers sensing the rotating speed of the wheel by means of a wheel sensor and, optionally, subsequent filtering of the sensed values.

13. A method according to any one of the preceding claims and according to claim 4, characterized in that the straight travel of the vehicle is detected by evaluating the time sequence of the difference of the wheel speeds preferably on the non-actuated axle of the vehicle.

14. A method according to claim 13, characterized in that, for evaluating the time sequence of the difference of the wheel speeds, the signal of difference is guided across a first deep pass with a first time constant and, in parallel thereto, across a second deep pass with a second time constant exceeding the first time constant, thereby checking whether the amount of difference of the output signals of the two filters is below a threshold value.

15. A method according to claim 14, characterized in that the first time constant is in the range of between 10 and 100 s.

16. A method according to claims 14 or 15, characterized in that the second time constant has a value 5 to 15 times the value of the first time constant.

17. A method according to any one of claims 14 through 16, characterized in that the threshold value decreases with an increasing vehicle speed.

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18. A method according to any one of claims 14 through 17, characterized by the step of checking whether the amount of difference of the output signals of both filters, within a gating time, permanently or at least for an adequate period of time, falls below the threshold value, and that, once this criterion is fulfilled, straight driving is detected.

19. A method according to any one of claims 14 through 18, characterized in that, for detecting straight driving, also the time sequence of the output signal of the second deep pass is checked whether, within a gating time, it permanently or for an adequate period of time, falls below a threshold value.

20. A method according to any one of claims 14 through 19, characterized in that the evaluation in groups for the wheels of one axle is continuous in that upon detection of straight driving, the output signal of the second deep pass is stored as a reference value preliminarily representing the result of the evaluation, the reference value is compared to current output signals of the second deep pass and, in case of differences, the reference value is tracked with part of the difference to the current signal value, with an acknowledgement signal used to release the stored reference value being additionally generated if the difference within a predetermined period of time was sufficiently small.

21. A method for determining the wheel speeds of a vehicle, comprising the following steps: sensing the wheel speeds by wheel sensors, determining a correction value for each wheel in respect of the wheel speed sensed on that wheel in accordance with a method of one of the preceding claims, and correcting the sensed wheel speeds in accordance with the corresponding values of correction.

22. A method according to claim 21, characterized in that the values of correction are factors of correction by which the sensed wheel speeds are multiplied.

09647109-122700

23. A method according to any one of the preceding claims and according to claim 4, characterized in that the driving state is determined under conditions favorable for the evaluation of the wheel speed values of the group under consideration on the basis of corrected wheel speed values, with the correction being effected in accordance with previously determined values of correction.

24. A device for determining values of correction for the wheel speeds of a vehicle, comprising wheel sensors (111 - 114) for determining the speeds of the wheels (101 - 104) of the vehicle during travel, characterized by a determining means (230, 601 - 607) evaluating the speeds of the vehicle wheels in groups for at least one vehicle axle and at least one vehicle side, and determining the values of correction for the individual wheels of the vehicle in accordance with the results of evaluation.

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25. A device according to claim 24, characterized in that in that the determining means (230, 601 - 607) comprises a means (601) for evaluating, in groups, the speeds of the wheel of the non-driven axle, and respectively one device (601, 603) for evaluating, in groups, the speeds of the wheels on the left-hand vehicle side and the right-hand vehicle side.

26. A device according to claims 24 or 25, characterized by a state detection means (210, 401 - 410) determining a driving state in which conditions for the wheel speed values of the group under consideration prevail that are favorable for evaluating wheel speeds, in groups.

27. A device according to claim 26, characterized in that the state detection means (210, 401 - 410) comprises a detecting means (401 - 410) for detecting straight travel of the vehicle.

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28. A device according to claims 26 or 27, characterized in that the state detecting means (210, 401 - 410) comprises a detecting means for detecting the disengaged state in the vehicle.

29. A device according to any one of the preceding claims, characterized in that a device (601 - 603) for evaluating, in groups, wheel speeds comprises a means (401) for the ratio formation and/or the difference formation and/or for the normalization, in pairs, of the speeds of the wheels of the said group.

30. A device according to any one of the preceding claims and according to claim 27, characterized in that the detecting means for detecting the straight travel of the vehicle comprises at least one deep pass (402, 403) evaluating the value of the difference between the wheel speeds of one axle.

31. A device according to claim 30, characterized in that the detecting means for detecting the straight travel comprises a first deep pass (402) with a first time constant, and a second deep pass (403) with a second time constant exceeding the first time constant, and a check means for checking the difference of the output signals of the two filters.

32. A device according to claim 31, characterized in that the first time constant is in the range of between 10 and 100 ms.

33. A device according to claims 31 or 32, characterized in that the second time constant has a value 5 to 15 times the first time constant.

34. A device according to any one of claims 31 through 33, characterized by a means (505, 506) for checking whether the amount of difference of the output signals of both

09647109-122700

filters, within a gating time, permanently or at least for an adequate period of time, falls below the threshold value.

35. A device according to ~~any~~ ^Aone of claims 31 through 34, characterized by a means (507, 508) for checking the time sequence of the output signal of the second deep pass (403).

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